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# Post-War Developments of Army Ordnance

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**T**HIS subject is one of vital current interest not only to the engineering profession but to many branches of modern industry. The observation of National Defense Day on September 12th last served to further impress upon the public the fact that industrial preparedness is no small factor in maintaining peace and national prosperity. One of the many lessons learned as a result of experience during the World War was the importance of establishing and maintaining active cooperation and understanding of current and prospective ordnance problems between the official representatives of the U. S. Government and American engineers and industrialists. The Ordnance Department of the U. S. Army, which is making real progress along these lines, is entitled to the active support not only of the engineering profession but of corporation executives conducting the affairs of American industries.

A brief outline of some of the recent improvements in the design and construction of ordnance equipment is herein presented.

Perhaps the most noteworthy achievements in U. S. Ordnance since the signing of the armistice are the development of the 16"/50 Cal. Coast Defense Gun, the 14"/50 Cal. Railway Gun, the Cal. 50 Super-machine gun, the 3"/55 Cal. Anti-aircraft gun, and the redesigning of the 75 mm. field gun.

The 16"/50 Cal. Coast Defense gun is the most powerful American piece. It was necessary for us to have a weapon for coast defense which would outrange the guns of any battleship, and this gun is the result of development along this line. As an anti-naval gun it can successfully protect our coast, as it is capable of hurling an armor piercing projectile, weighting 2340 lbs., to a distance of 31½ miles. This type of projectile is capable of penetrating 14" armor plate at all ranges. This gun has an over-all length of approximately 70 ft., weighs over 200 tons and can be fired at the rate of one round per minute, the propellant charge of smokeless powder weighing approximately 850 lbs.

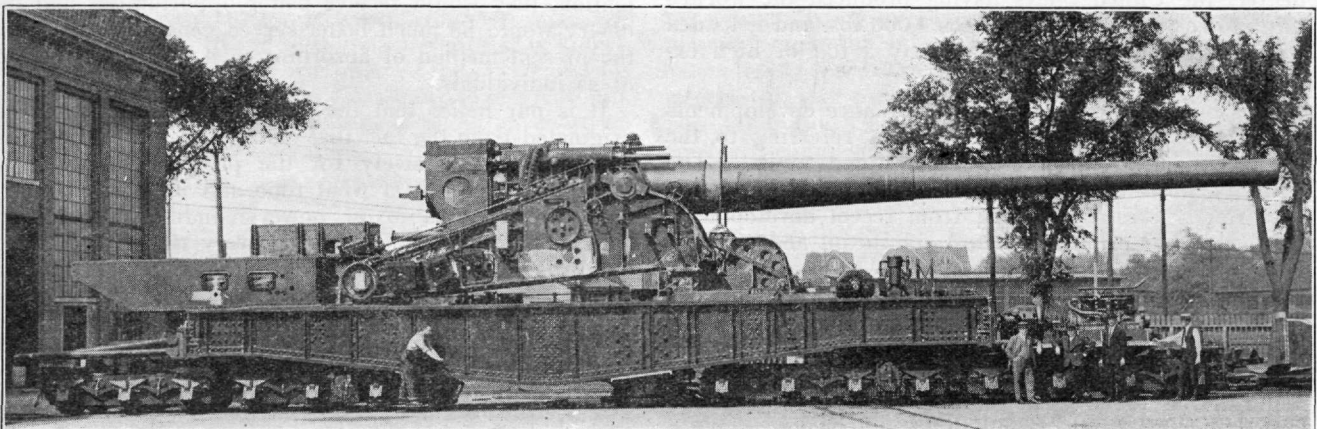
The successful solution of the problem of providing a large caliber gun that could be hauled over the railroads has involved the development of the 14"/Cal.

Railway Mount gun which can be used either as a semi-mobile weapon for field operation or for coast defense. It has a maximum elevation of 50 degrees with an all-round traverse and a range of approximately 22½ miles, the length being over 50 ft., and its weight about 120 tons.

In air craft armament the Cal. 50 super-machine gun is the latest and most effective weapon. Experience in the World War revealed that the Cal. 30 incendiary bullet would not always ignite hydrogen gas with which dirigibles and observation balloons were inflated, and that it is necessary to use a larger bullet fired at a higher velocity. To meet this demand Mr. J. M. Browning, the inventor of the Browning machine gun, designed the present Cal. 50 machine gun, which has a horizontal range of 9000 yards and can be fired at the rate of approximately 500 rounds per minute, the weight of the bullet being over five times that of the old Cal. 30 bullet. During the World War operation of machine guns from aeroplanes of the type equipped with the propellers in front, presented a perplexing problem. A synchronizing gear was developed during the war and subsequently perfected which has a cam mechanism interposed between the engine of the aeroplane and the firing mechanism of the machine gun so that when a propeller blade is in the line of fire the gun does not function, the result being that the bullet from a machine gun mounted in an aeroplane actually passes between the rapidly rotating blades of the propeller.

In the early days of the World War the United States had no mobile anti-aircraft gun mounts, but has subsequently developed the 3" and 4.7" pieces, both of which are mobile and have ranges of 10 and 11½ miles respectively with an all-round angle of fire at elevations of from -5 to +80°.

The French 75 mm. gun, which was such a reliable and valuable field piece during the World War, was by no means perfect as regards range, limits of elevation and traverse. As a result of improvements in this piece the range has been increased from 9,000 yards up to 15,000 yards, the latest design of carriage permitting an



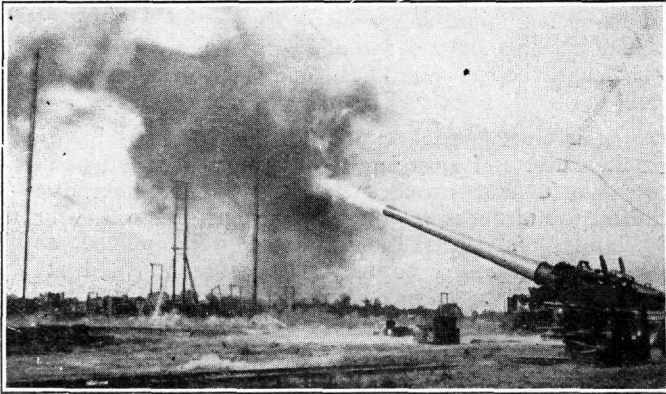
A 14-inch gun on railway mount raised to firing position at 0° elevation.

elevation of  $45^{\circ}$  and a traverse of  $42^{\circ}$ , with a very small increase in weight.

Post war ordnance developments have not been confined to improvements in the design of guns and it is probably no exaggeration to say that the improvements in projectiles and propellants have been more rapid and significant since the armistice than in the previous forty years. The efforts to improve smokeless powder propellants have been directed towards the reduction of the erosive effect on the gun barrel, more uniform ballistic properties, and the development of flashless non-hydro-

defensive power, speed and mobility than the types used so effectively during the World War.

For more detailed information regarding modern ordnance, the reader is referred to the article by Major General C. C. Williams, Chief of Ordnance, U. S. A., appearing on Page 565 et seq. Volume V, No. 27 of the Army Ordnance Journal, and Major LeRoy Hodges' book "Post War Ordnance."



A 16-inch coast defense gun on Barbettes mount, being fired at meeting of Army Ordnance Association Proving Grounds.

scopic smokeless powder, the latest types of propellants possessing markedly improved characteristics in this respect.

Our standard Springfield rifle, which of course is the most important item of small arms equipment, has proved to be equal or superior to any existing military rifle in the world and has therefore not been susceptible to radical changes in design, but its ammunition has been improved, the most noteworthy feature being the development of the new type of boat tail  $9^{\circ}$  bullet, which is heavier, gives better accuracy, with 50% increase in range, and reduces the metal fouling in the rifle barrel. Small arms ammunition developments also include the improvement of tracer ammunition as regards more uniform functioning, greater accuracy and longer duration, successful experimental work along these lines also having resulted in the development of satisfactory tracing projectiles for the anti-aircraft guns.

Closely allied to the problems of designing heavy projectiles for artillery field pieces and coast defense guns is the improvement in types of bombing aeroplanes and drop bombs. The carrying power, cruising range and equipment of the former and the size and effectiveness of the latter have been extended to a remarkable degree, the United States having produced the world's largest drop bomb, which weighs 4,000 lbs. and is loaded with a demolition charge of nearly a ton of high explosive.

This brief outline of post war ordnance developments would not be comprehensive without referring to the numerous improvements in tractors and tanks. The mobility, both as regards speed and practical operation over rough terrain, resulting from recent developments in tractor design has been most significant and effective in connection with the movement of field pieces and other artillery equipment. Incidentally the United States has perfected a remarkable ordnance repair shop on wheels, consisting of tractors and trailers fitted with the essentials of the modern machine shop, including electric-motor-driven tools. The improvement in tanks have been along the lines of both light and heavy ordnance units in this category, with far greater offensive and